

REMARKS

In the April 23, 2003 Office Action, the Examiner rejected claims 1-20 pending in the application. In addition, the Examiner objected to the title of the invention as not descriptive. This Response amends the title, amends claims 1, 8-10, 13, and 15-17, and cancels claims 2, 7, 11, and 20 without prejudice or disclaimer. Support for the amended claims may be found in the originally filed specification, and thus, no new matter is added by this amendment. After entering the foregoing amendments, claims 1, 3-6, 8-10, and 12-19 (4 independent claims; 16 total claims) remain pending in the application. Reconsideration is respectfully requested.

TELEPHONIC INTERVIEW

In the telephone interview of August 22, 2003, the Examiner (Vinh Nguyen), the Applicants' representative (David O. Caplan), and one of the inventors, Scott Williams, discussed the Office Action of April 23, 2003, the cited references from the Office Action, and proposed amendments to the claims. Agreement as to claim amendments that would overcome the claim rejections from the Office Action was not reached.

TITLE OF THE INVENTION

The title of the invention stands objected as not descriptive. The above amendment to the title is in response to the Examiner's objection. Specifically, the new title of the invention is "A Probe Card With Removable Head Plate Containing Multiple Beam Assemblies With Multiple Probes For High Parallel Testing".

CLAIM REJECTIONS

Claims 1, 2, 4, 5, 8 and 16-20 stand rejected under 35 U.S.C. §102(b) as being anticipated by Subramanian, U.S. Patent No. 5,382,898, issued January 17, 1995 (hereinafter "Subramanian"). In particular, the Examiner stated that "Subramanian discloses a probe card having a head plate (12) with an opening (15), a beam assembly (20, 28, 35) mounted across the opening of the head plate (20, 28, 35) and a plurality of probe needles (30, 31) extending through the beam assembly." Applicants have cancelled claims 2 and 20 without prejudice or disclaimer. Applicants respectively traverse this rejection.

Subramanian generally discloses a probe card formed of a printed circuit board having an opening therein. As illustrated in Figure 4, which shows a bottom view of the probe card, the probe card has a ring shape. Applicants respectfully assert that reference numerals 20, 28 and 35 do not correspond to a plurality of rectangular beam assemblies that are mounted across the opening of a head plate, wherein each of the plurality of beam assemblies is substantially parallel as recited by amended independent claims 1 and 16. Rather, reference number 20 corresponds to "a ground strip (20) formed into a ring" that is supported by the probe card. (Column 3, lines 21-22) In addition reference number 28 corresponds to a lower surface of the ground strip 20 (see for example column 3, lines 38-40). Furthermore, reference number 35 corresponds to an encapsulating material that supports and holds probes (25, 26) such that the probes are maintained a pre-determined distance from the lower surface (28) of the ground strip (20). (Column 3, lines 57-60) Thus, the probes disclosed by Subramanian are held in place by an encapsulated material and the probes are maintained a pre-determined distance from the lowest surface of a ground strip that is formed into a ring.

In contrast to Subramanian, amendment independent claim 1 provides for "a plurality of rectangular beam assemblies mounted to the head plate and disposed across the opening of the head plate, wherein each of the plurality of beam assemblies is substantially parallel" and "wherein each of the rectangular beam assemblies comprises: a support beam removably mounted to the head plate; and a probe guide mounted to the support beam, wherein the first end of each probe needle extends through the probe guide." Similarly, Applicants amended independent claim 16 recites "inserting the probe needle through a rectangular beam assembly, such that the first end of the probe needles extends through the rectangular beam assembly", "mounting the rectangular beam assembly on the head plate such that the beam assembly is disposed across the opening of the head plate", and "repeating the mounting step for a plurality of rectangular beam assemblies, wherein the rectangular beam assemblies are configured substantially parallel to each other." Subramanian does not disclose these recited elements.

Thus, Subramanian does not disclose each and every element of amended independent claims 1 and 16. Support for the amendments to independent claims 1 and 16 can be found in originally filed specification. No new matter has been introduced.

For the above reasons, Applicants submit that each and every element of independent claims 1 and 16 are not disclosed by Subramanian. Accordingly, claim 1 (and claims 4, 5 and 8

which dependent from claim 1) and claim 16 (and claims 17-19, each of which variously depend from claim 16) are not anticipated by Subramanian, and Applicants respectfully request withdrawal of the rejection of claims 1, 4, 5, 8 and 16-19 under 35 U.S.C. §102(b).

Claims 1, 2, 5, 8, 10, 11 and 15-20 stand rejected under 35 U.S.C. §102(b) as being anticipated by Grangroth et al., U.S. Patent No. 4,649,339, issued March 10, 1987 (hereinafter "Grangroth"). In particular, the Examiner stated that "Grangroth et al disclose an apparatus as shown in Figure 2 having a sub-structure (38), a head plate (54, 60, 62, 66) mounted to the sub-structure, a beam assembly (10) and a plurality of probe needles (18) extending through the beam assembly (10)." Applicants have cancelled claims 2, 11 and 20 without prejudice or disclaimer. Applicants respectively traverse this rejection.

Grangroth generally discloses an integrated circuit interface for testing an integrated circuit device through a plurality of contacts on an exposed surface of the device. As illustrated in Figures 2 and 3, a plurality of contacts (12) are disposed on a first surface (30) of a flexible sheet (10). (Column 1, lines 40-47) A plurality of thin film conductors (18) are patterned on sheet (10), where each of the conductors are connected to a contact (12). (Column 1, lines 48-51)

Applicants submit that each and every element of independent claims 1, 10, 15 and 20 are not disclosed by Grangroth. For example, with regards to amended independent claims 1, 10, and 15, the cited reference fails to disclose or suggest "a plurality of rectangular beam assemblies mounted to the head plate and disposed across the opening of the head plate, wherein each of the plurality of beam assemblies is substantially parallel." With regards to amended independent claim 16, Grangroth fails to disclose or suggest "inserting the probe needle through a rectangular beam assembly", "mounting the rectangular beam assembly on the head plate such that the rectangular beam assembly is exposed across the opening of the head plate", and "repeating the mounting step for a plurality of rectangular beam assemblies, wherein the rectangular beam assemblies are configured substantially parallel to each other." Accordingly, amended independent claim 1 (and claims 5, and 8, each of which variously depends from claim 1) and amended independent claims 10, 15, and 16 (and claims 17-19, each of which variously depends from claim 16) are not anticipated by Grangroth, and Applicants respectfully request withdrawal of the rejection of claims 1, 5, 8, 10, and 15-19 under 35 U.S.C. §102(b).

Claims 1, 7 and 16-20 stand rejected under 35 U.S.C. §102(b) as being anticipated by Hasegawa, U.S. Patent No. 5,982,184, issued November 9, 1999 (hereinafter "Hasegawa"). In particular, the Examiner stated that "Hasegawa disclose an apparatus as shown in figures 1-2 having a head plate (22) with an opening, a plurality of beam assemblies (26) mounted to the head plate (22) and plurality of probe needles (30) extending through the beam assemblies (26)." Applicants have cancelled claims 7 and 20 without prejudice or disclaimer. Applicants respectively traverse this rejection.

Hasegawa generally discloses a test head for integrated circuits. The test head includes a probe holder and a frame form for holding a plurality of first probes and supporting bodies in a plate form for supporting a plurality of second probes.

Applicants submit that each and every element of independent claims 1 and 16 are not disclosed by Hasegawa. For example, with regards to amended independent claim 1, Hasegawa fails to disclose or suggest "a plurality of rectangular beam assemblies mounted to the head plate and disposed across the opening of the head plate, wherein each of the plurality of beam assemblies is substantially parallel" and "wherein each of the rectangular beam assemblies comprises: a support beam removably mounted to the head plate; and a probe guide mounted to the support beam, wherein the first end of each probe needle extends through the probe guide." With regards to amended independent claim 16, Hasegawa fails to disclose or suggest "inserting the probe needle through a rectangular beam assembly", "mounting the rectangular beam assembly on the head plate such that the rectangular beam assembly is exposed across the opening of the head plate", and "repeating the mounting step for a plurality of rectangular beam assemblies, wherein the rectangular beam assemblies are configured substantially parallel to each other." Accordingly, amended independent claim 1 and amended independent claim 16 (and claims 17-19, each of which variously depends from claim 16) are not anticipated by Hasegawa, and Applicants respectively requests the withdrawal of the rejection of claims 1 and 16-19 under 35 U.S.C. §102(b).

Claims 3, 6 and 9 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Subramanian. In particular, the Examiner stated that for each of claims 3, 6 and 9 it would have been an obvious design choice to modify Subramanian to produce the inventions of each of claims 3, 6 and 9. Applicants respectively traverse this rejection.

Applicants submit that Subramanian does not provide for all the elements of independent claim 1 (claims 3, 6 and 9 depend upon independent claim 1) as recited above. For the above reasons, Applicants submit that the invention of claims 3, 6 and 9 would not have been obvious over Subramanian and therefore claims 3, 6 and 9 are allowable. Accordingly, Applicants respectively request the withdrawal of the rejection of claims 3, 6 and 9 under 35 U.S.C. §103(a).

Claim 12 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Grangroth. In particular the Examiner stated that "it would have been obvious for one of ordinary skill in the art to have the sub-structure (38) made of printed circuit board since the type of the sub-structure does not effect on the test results." Applicants respectively traverse this rejection.

Applicants submit that Grangroth does not provide for all the elements of independent claim 10 (claim 12 depends upon independent claim 10) as recited above. For the above reasons, Applicants submit that the invention of claim 12 would not have been obvious over Grangroth and therefore claim 12 is allowable. Accordingly, Applicants respectively request the withdraw of the rejection of claims 3, 6 and 9 under 35 U.S.C. §103(a). For the above reasons, Applicants submit that the invention of claim 12 would not be obvious over Grangroth and therefore claim 12 is allowable. Applicants respectively request the withdrawal of the rejection of claim 12 under 35 U.S.C. §103(a).

Claim 12 stands rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claiming the subject matter which Applicant regards as the invention. In particular, the Examiner stated that for claim 12, "it is unclear what 'printed circuit board' represents". As discussed with the Examiner during the telephone interview of August 22, 2003, "printed circuit board" corresponds to sub-structure 310 as shown in Figure 3 (see Paragraph 0018 of the Specification as originally filed). Accordingly, Applicants respectively request withdrawal of the rejection of claim 12 under 35 U.S.C. §112, second paragraph.

Claim 13 stands rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claiming the subject matter which Applicant regards as the invention. In particular, the Examiner stated that "it appears that the limitation of the 'first end extends through the beam assembly for contacting the printed circuit board' appears to be inaccurate." In addition, Claim 13 stands rejected under 35 U.S.C. §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable

one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention." In particular, the Examiner states that "it appears that the specification does not have sufficient support for the limitation of 'the first end extends through the beam assembly for contacting the printed circuit board' as recited in claim 13." Applicants respectively traverse these rejections to claim 13.

Sufficient support exists in the specification as originally filed for the limitation of "the first end extends through the beam assembly for contacting the printed circuit board" as recited in claim 13 and Applicants assert that this limitation is accurate. In particular, as shown in Figures 5 and 8, and described, *inter alia*, in Paragraph 0024, "a first end 800 of the probe needle extends through the beam assembly for contacting sub-structure 310 and a second end 810 of the probe needle extends through the beam assembly for contacting the wafer undergoing test."

Accordingly, Applicants respectively request withdrawal of the rejection of claim 13 under 35 U.S.C. §112, first and second paragraphs.

CONCLUSION

In view of the foregoing, Applicant respectfully submits that all of the pending claims fully comply with 35 U.S.C. § 112 and are allowable over the prior art of record. Reconsideration of the application and allowance of all pending claims is earnestly solicited. Should the Office wish to discuss any of the above in greater detail or deem that further amendments should be made to improve the form of the claims, then the Office is invited to telephone the undersigned at the Office's convenience.

Respectfully submitted,

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